

**IEEE P802.11
Wireless LANs**

Text changes for new CCA approach

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Abstract

Proposed text for the CCA paragraph in IEEE P802.11B/D2.0

1.1.1.1 Clear Channel Assessment

The DSSS PHY shall provide the capability to perform Clear Channel Assessment (CCA) according to at least one of the following three methods:

CCA Mode 1: Energy above threshold. CCA shall report a busy medium upon detecting any energy above the ED threshold. Once in the busy state CCA shall report an idle medium once the energy drops below the ED threshold or as described in the PLCP receive procedure.

CCA Mode 2: Carrier sense with energy above threshold. CCA shall report a busy medium upon the detection of a 1 or 2 Mbps DSSS signal (Barker code based; so also on the preambles as defined within this HR/DSSS standard) with energy above the ED threshold. Upon detection a timer is started. Once in the busy state CCA shall report an idle medium under the following conditions (in order of preference):

1. Conditions as prescribed in the receive procedure. (Note: where the receive procedure prescribes that CCA will indicate a busy medium, this prescription overrules conditions 2 and 3)
2. Energy falls below the threshold
3. Expiration of the timer

CCA Mode 3: Carrier sense with energy above or below the threshold. CCA shall report a busy medium upon the detection of a 1 or 2 Mbps DSSS signal (Barker code based; so also on the preambles as defined within this HR/DSSS standard) with energy above or below the ED threshold.

In the case energy is above the threshold a timer is started. Once in the busy state CCA shall report an idle medium under the following conditions (in order of preference):

1. Conditions as prescribed in the receive procedure. (Note: where the receive procedure prescribes that CCA will indicate a busy medium, this prescription overrules conditions 2 and 3)

2. Energy falls below the threshold
3. Expiration of the timer

In the case energy is below the threshold a timer is started. Once in the busy state CCA shall report an idle medium under the following conditions (in order of preference):

1. Conditions as prescribed in the receive procedure. (Note: where the receive procedure prescribes that CCA will indicate a busy medium, this prescription overrules conditions 2 and 3)
2. Carrier sense drops
3. Expiration of the timer

The energy detection status shall be given by the PMD primitive, PMD_ED. The carrier sense status shall be given by PMD_CS. The status of PMD_ED and PMD_CS are used in the PLCP convergence procedure to indicate activity to the MAC through the PHY interface primitive PHY-CCA.indicate.

A Busy channel shall be indicated by PHY-CCA.indicate of class BUSY.

Clear Channel shall be indicated by PHY-CCA.indicate of class IDLE.

The PHY MIB attribute aCCAModeSupprt shall indicate the appropriate operation modes. The PHY shall be configured through the PHY MIB attribute aCurrentCCAMode.

The CCA shall be TRUE if the medium is idle according to the CCA modes chosen. The CCA parameters are subject to the following criteria:

- a) The energy detection threshold shall be less than or equal to -80 dBm for TX power > 100 mW, -76 dBm for 50 mW < TX power <= 100 mW, and -70 dBm for TX power <= 50 mW. The threshold is not necessary a fixed value for a given implementation, but can be varied to improve performance, as long as the minimal requirements are met.
- b) The timer shall be minimal set to 19.5 ms (longest anticipated frame at 1 Mbit/s, 2400 bytes)
- c) With a valid signal (according to the CCA mode of operation) present at the receiver antenna within 5 μ s of the start of a MAC slot boundary, the CCA indicator shall report channel busy before the end of the slot time. This implies that the CCA signal is available as an exposed test point. Refer to Figure 47 for a definition of slot time boundary definition.
- d) In the event that a correct PLCP Header is received, the DSSS PHY shall hold the CCA signal inactive (channel busy) for the full duration as indicated by the PLCP LENGTH field. Should a loss of carrier sense occur in the middle of reception, the CCA shall indicate a busy medium for the intended duration of the transmitted packet.

Conformance to DSSS PHY CCA shall be demonstrated by applying a HR/DSSS compliant signal (all rates: 1,2,5.5 and 11 Mbit/s, long preamble), above the appropriate ED threshold (a), such that all conditions described in (c) and (d) above are demonstrated. Also a 5.5 or 11 Mbit/s signal with a short preamble will be applied to demonstrate that CCA remains TRUE during the duration of the frame.